Armed Forces College of Medicine

AFCM

Introduction to Immune System

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Intended learning objectives (ILOs) of Introduction to Immunology

By the end of this lecture the student will be able to:

1. ***List the role of immune system in health and disease***
2. ***Outline the main functions of immune cells***

IMMUNITY

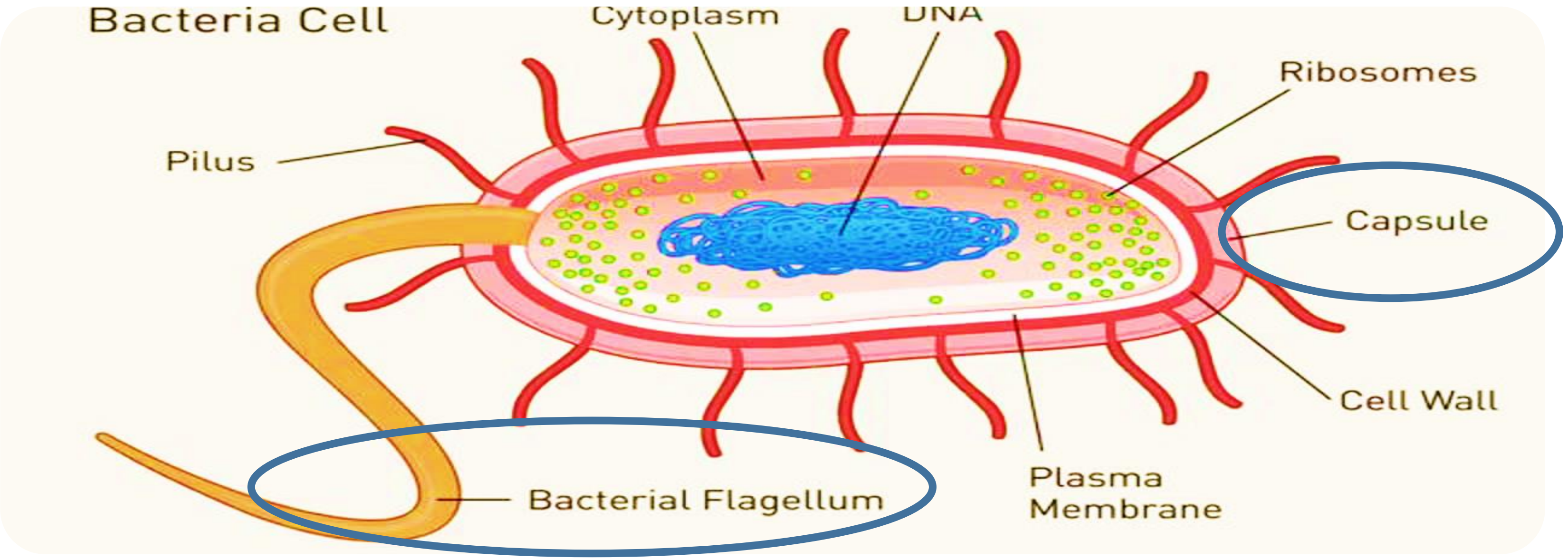
Antigen (Ag)

A molecule recognized by cells of immune system

e.g components of bacteria

⬇

Stimulation of immune response

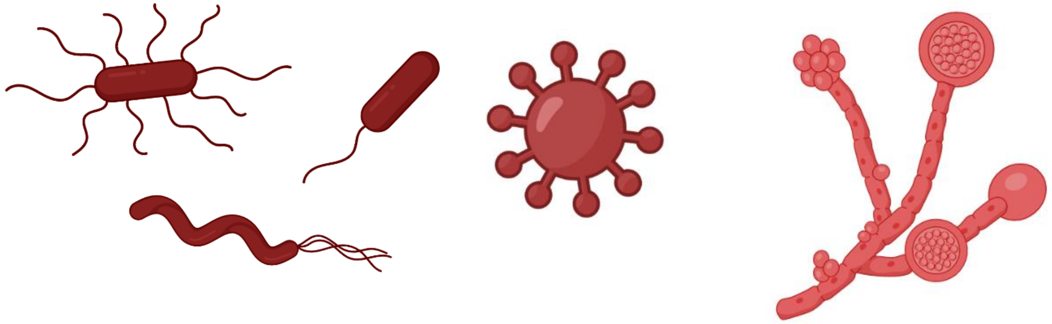


Immunity

Is the body’s defense against

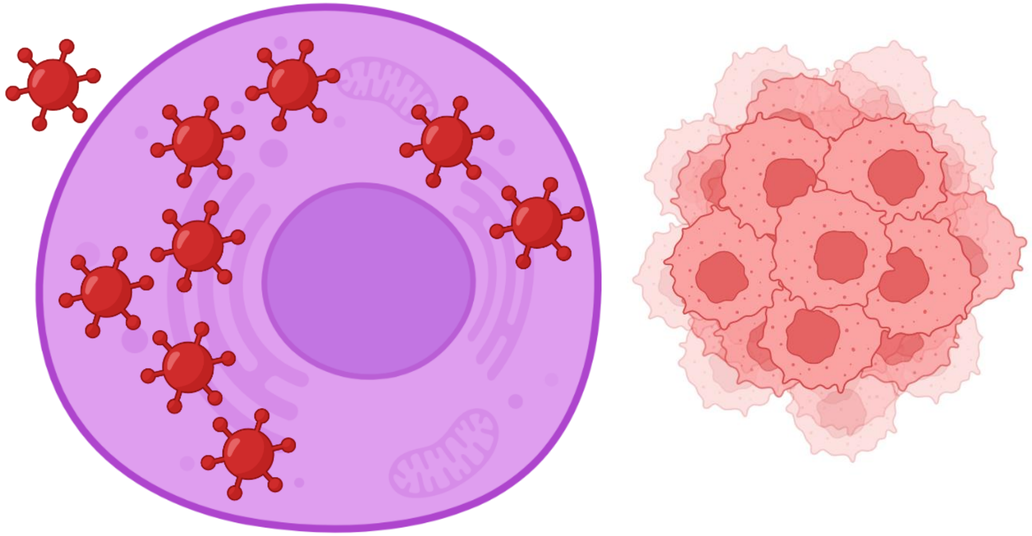
A) Foreign (non -self) substances

Infectious microorganisms



B) Diseased cells

infected cells & tumor cells)



Abnormal responses of Immune system

A) Exaggerated immune response

Hypersensitivity

(allergic diseases)

B) Immune response against self molecules

Autoimmune diseases

Types Of Immunity

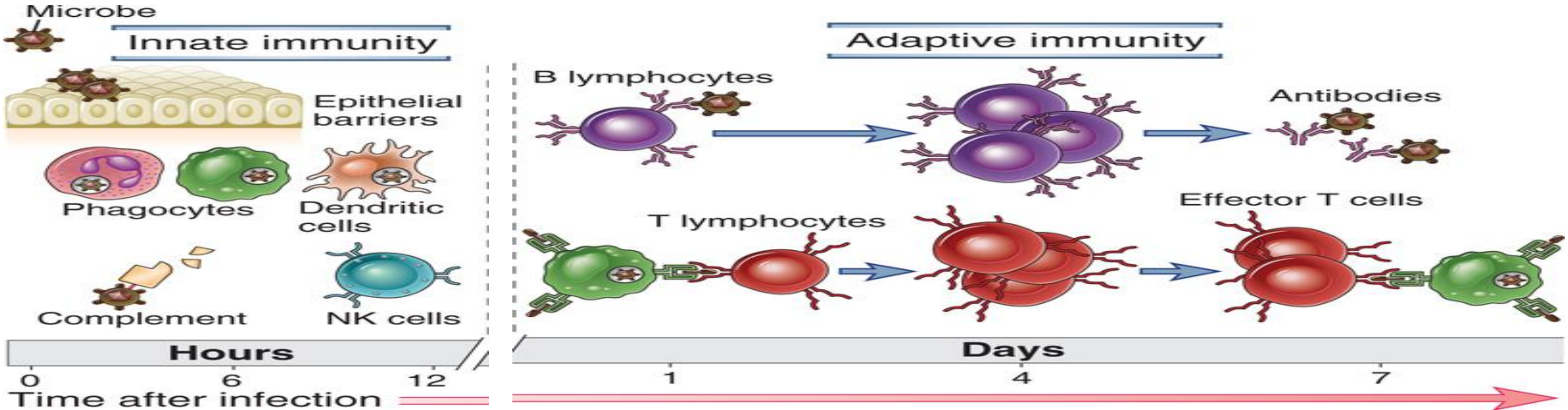
A) Innate (Natural) Immunity

1) **1st line** of defense → initial protection against infection

B) Adaptive (acquired) Immunity

Develops **more slowly** → **2nd line of defense**

2) Provides **more effective** protection



Main Components of Immune system

I) Tissues (Organs)

1ry Lymphoid organs

- Bone marrow
- Thymus

2ry Lymphoid organs

- Lymph nodes
- Spleen

II) Cells

1) Cells of **innate** immunity
2) Cells of **adaptive** immunity

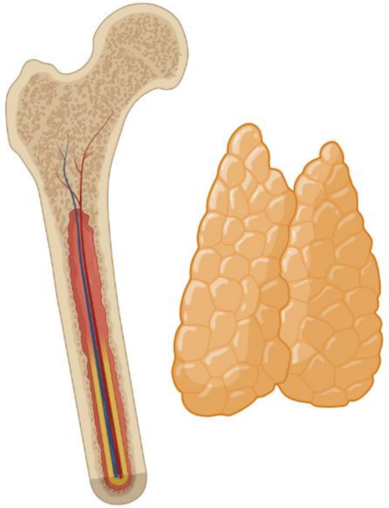
III) Circulating effector proteins (2C & 2A)

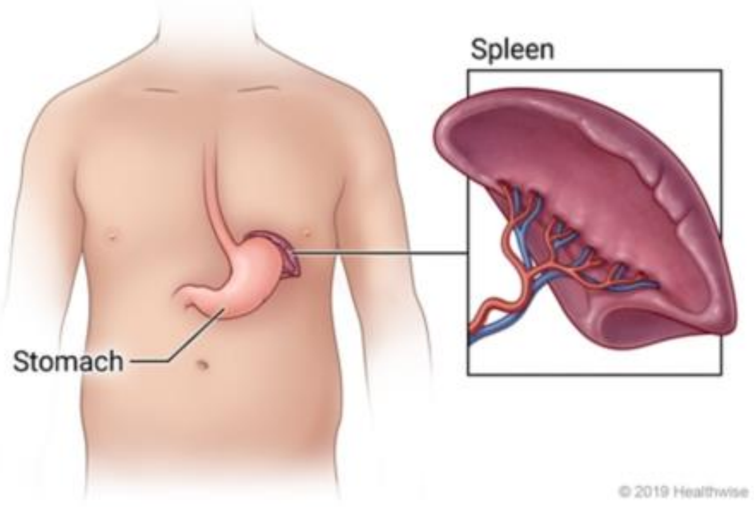
A) **C**ytokines

B) **C**omplement

C) **A**ntibodies

D) **A**cute phase proteins



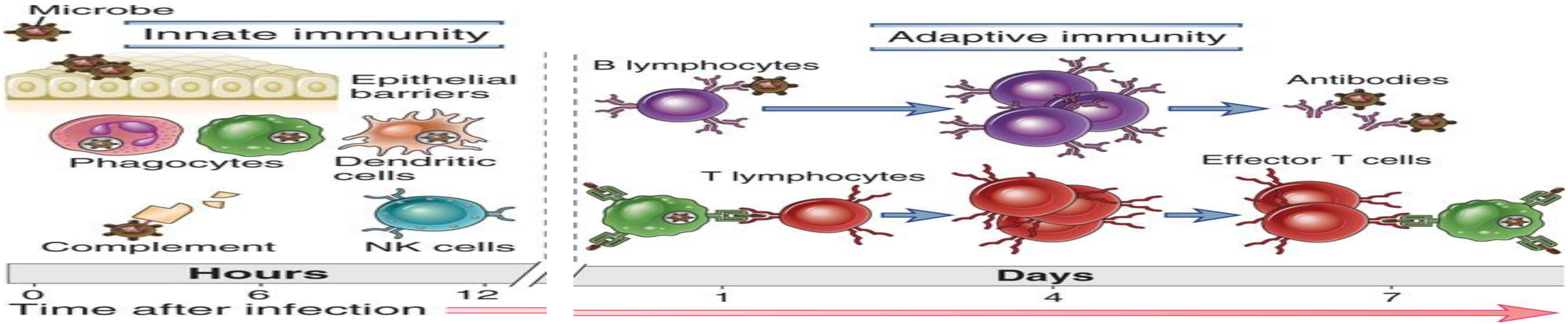


Cells of immune system: Leukocytes or White blood cells (WBCs)

Arise from stem cells in bone marrow ➜

Differentiate into myeloid cells & lymphoid cells

	Myeloid cells		**Lymphoid cells : lymphocytes**		
				T lymphocytes	**B lymphocytes**
Circulating In blood	- Neutrophils - Eosinophils - Basophils	Monocytes	Natural killer (NK) cells	1) T helper cells (Th) 2) T cytotoxic cells (Tc)	
Residing in tissues	Mast cells	- Macrophages - Dendritic cells			
	Cells of innate immunity			Cells of adaptive immunity (in blood & tissues)	



Quiz 1

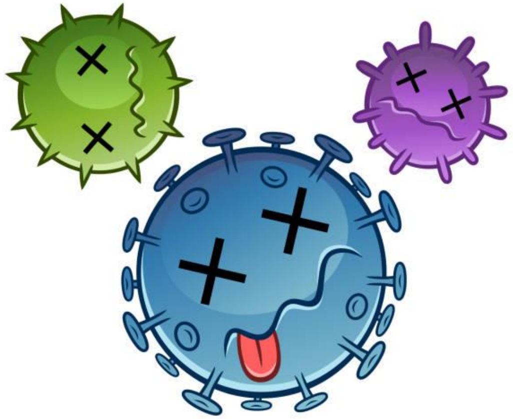
- **Which of the following immune cells is a lymphocyte that belong to innate immunity?**

A. T helper
B. T cytotoxic
C. T regulatory
D. Natural killer
E. Plasma cell

D

Main Functions Of Immune Cells

I) Killing



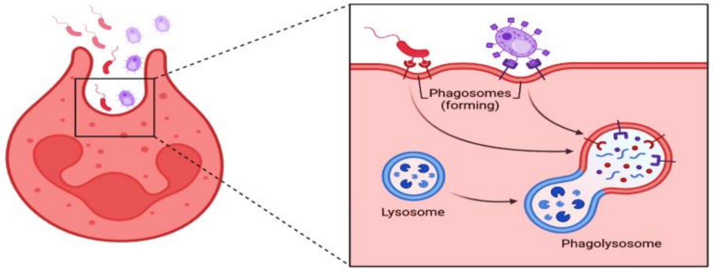
II) Secretion of effector proteins

Main Functions Of Immune Cells

I Killing

A Phagocytosis : Intracellular killing

Is engulfment & killing of microbe



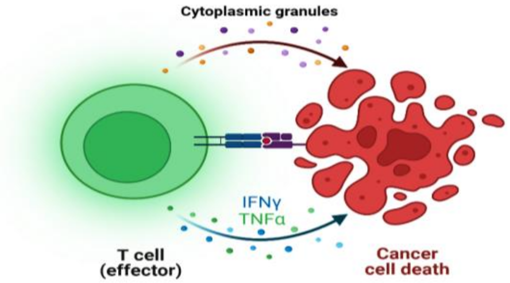
Phagocytes

1) Neutrophils 2) Monocytes/Macrophages (MQ) 3) Dendritic cells

B Cytotoxicity : Extracellular killing

Is the release of cytoplasmic granules → Lysis of large cells **that can't be phagocytosed**

e.g viral Infected cells, tumor cells,



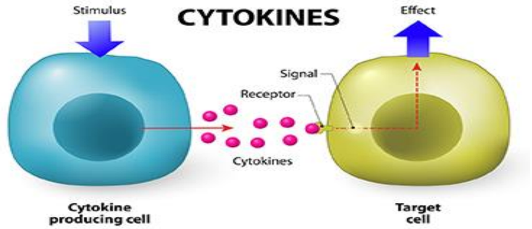
Cells responsible for cytotoxicity

1) T cytotoxic lymphocytes 2) NK cells 3) Eosinophils

II Secretion of effector proteins

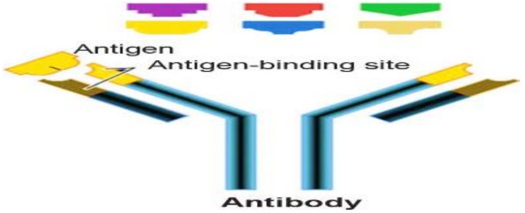
A Cytokines

- **Definition:** Small proteins produced in response to microbes
- **Importance :** Intercellular communications (interleukins)



B Antibody (Ab) or Immunglobulin (Ig)

- **Source :** activated B lymphocytes (plasma cell)



Quiz 2

Which of the following cells is phagocytic & resides in tissues ?

A. Neutrophils
B. Eosinophils
C. T cytotoxic
D. Monocytes
E. Dendritic cells

E